Passaic River Mile 10.9 Preliminary Human Health Risk Assessment

March 8, 2012

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What is Risk Assessment?

- EPA conducts risk assessments to provide a scientific characterization of risk based on a rigorous analysis of available information and knowledge.
- Risk Assessments provide a framework to understand the:
  - Nature and magnitude of the risk
  - Adversity of the risk
  - Confidence or reliability in estimates
  - Areas of uncertainty
  - Evidence supporting the decision

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Components of Risk Assessment

- Who is exposed?
- What is the exposure media?
- What activities bring them into contact with the River?
- What is the frequency and duration of the exposures?
- What are the potential health effects from this exposure?

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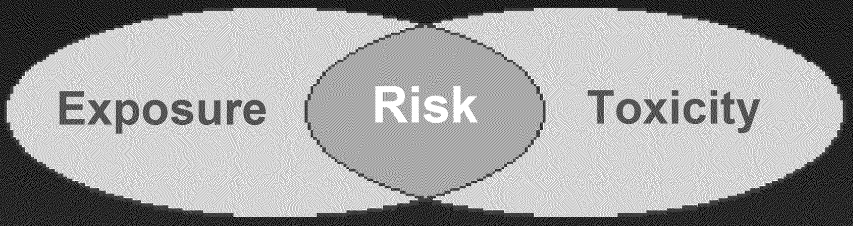
U.S. EPA Superfund Risk Assessment



Goal is health protection under reasonable maximum exposure conditions

Source of Toxicity Data: http://www.epa.gov/IRIS/

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River Mile 10.9 Area Sampling Data

- The Cooperating Parties Group conducted sampling of sediment in the river adjacent to the park.
- EPA conducted sampling of soil at the park.

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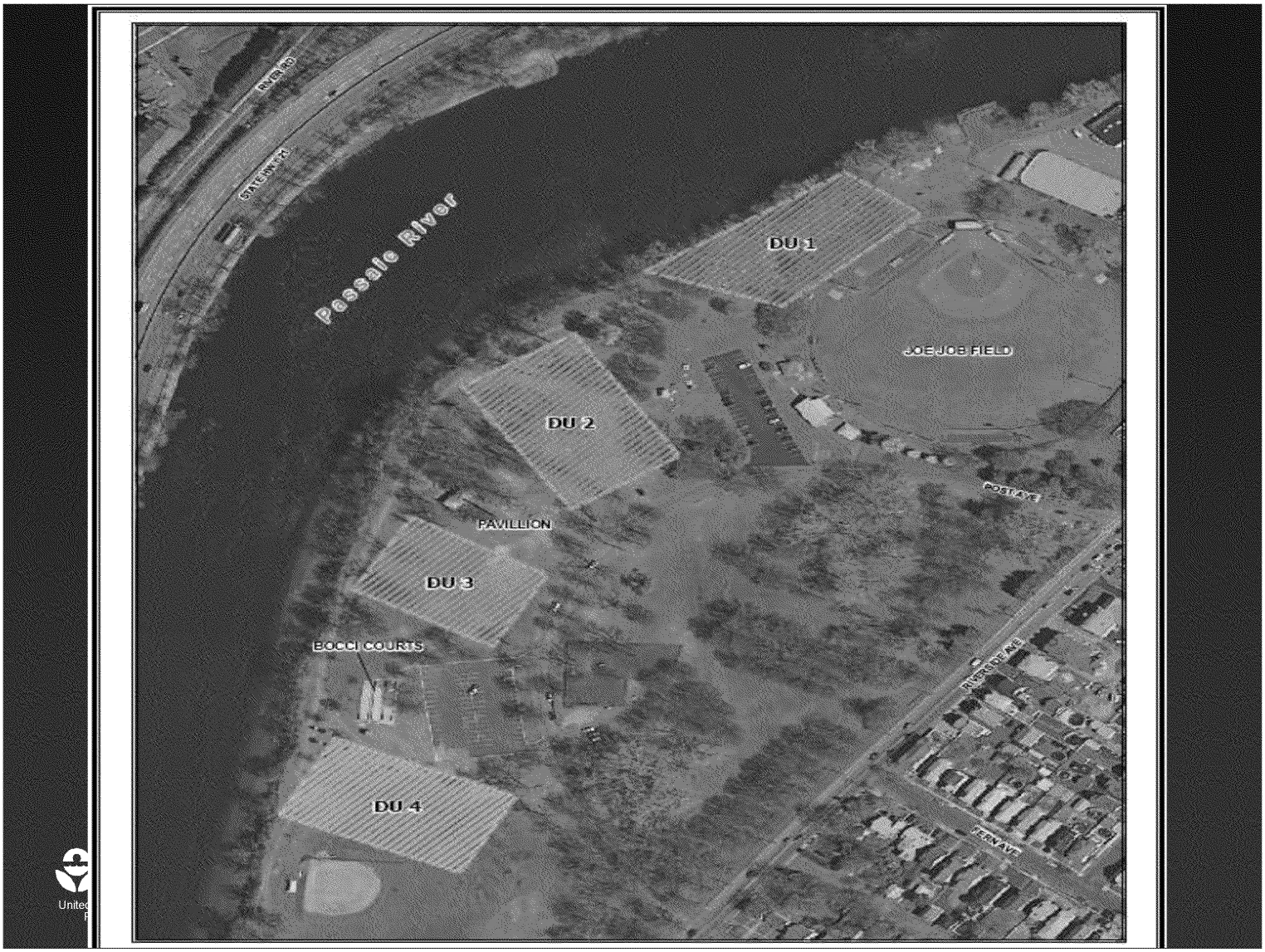

Park Recreational User Exposure Factors

		Adult User/ Worker	Adolescent	Child
		> 18 years	7 to 18 years	1 to 6 years
Bodyweight	kgs	70 (154 lbs)	43 (94.6 lbs)	15 (33 lbs)
Duration	years	25	12	6
Frequency	days/year	225	274	72
Ingestion Rate	mg/day	100	100	200
Skin Surface Area	cm^2	3,300	4,263	2,800
Adherence Factor	mg/cm^2	0.2	0.2	0.2

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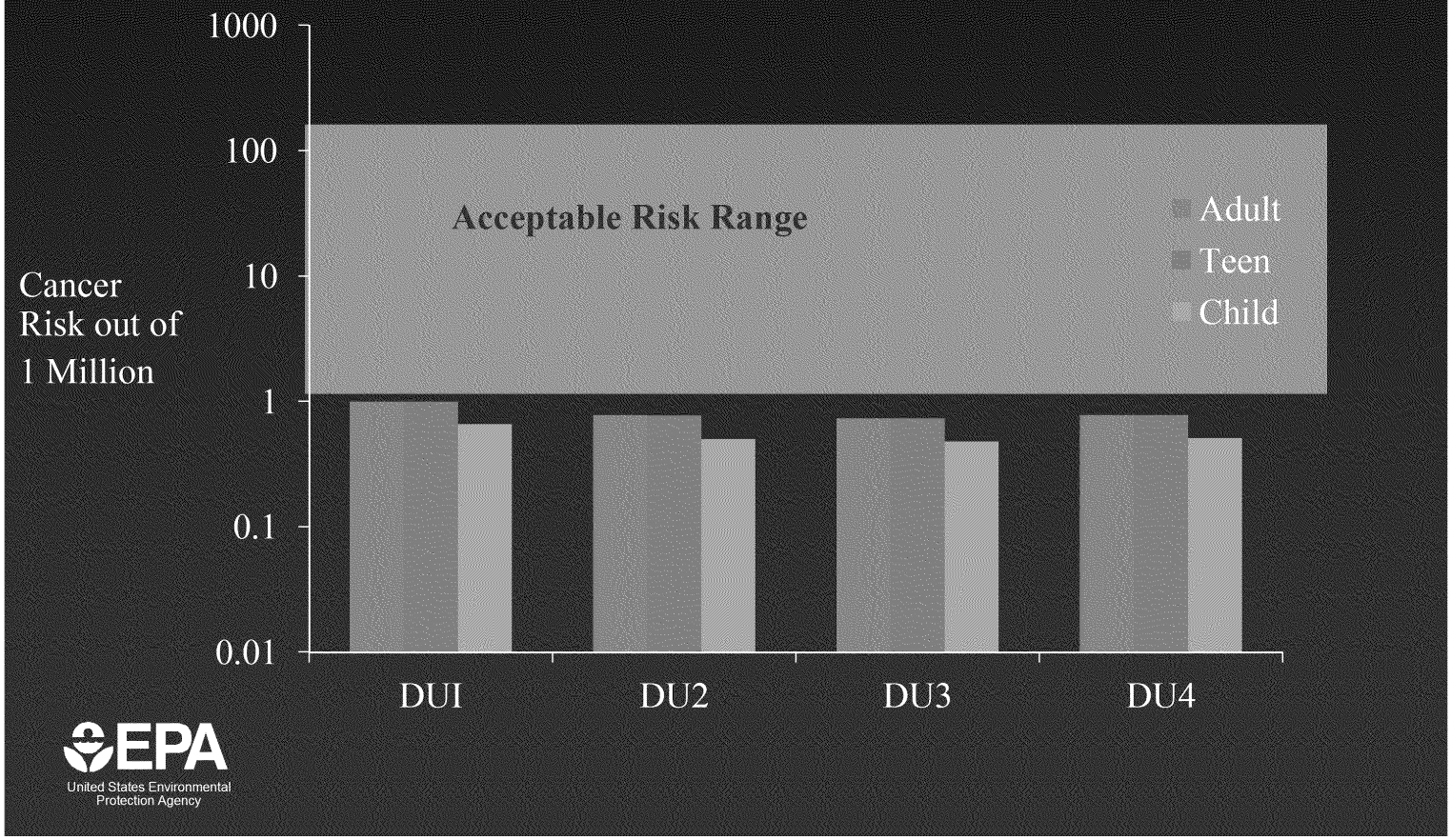
Cancer Risk Summary
Park Usage



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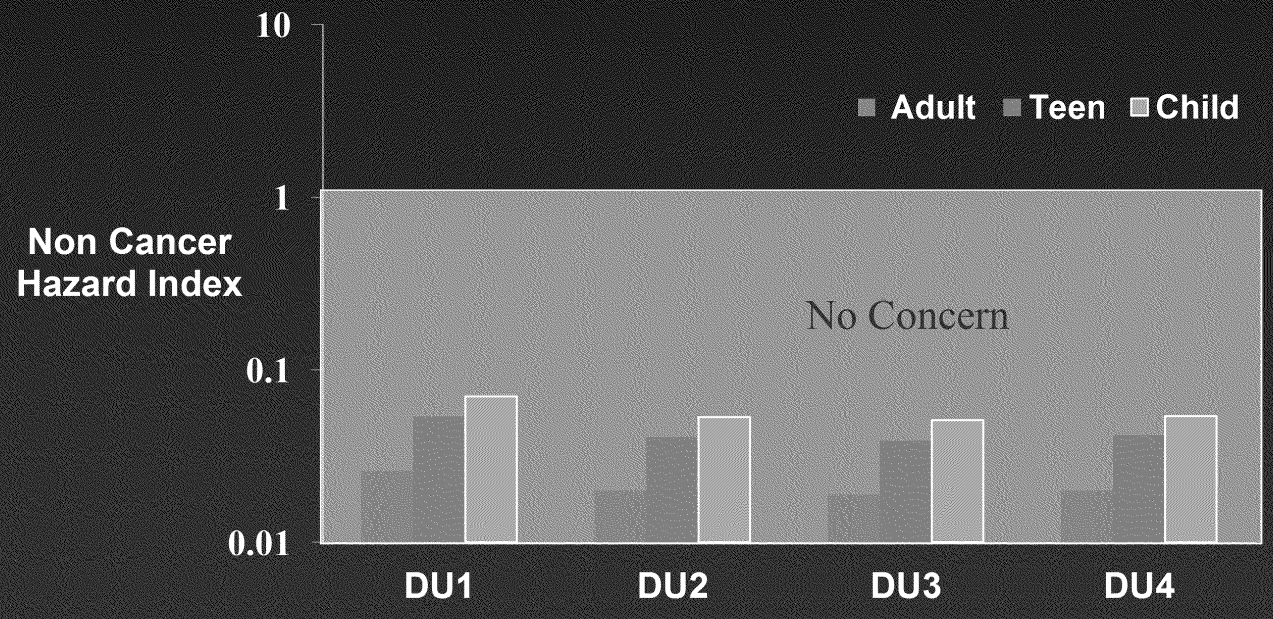
Non-Cancer Hazard Summary
Park Usage



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Sediment Exposures

- Boater – includes rowers who are on the river regularly and frequently
- Wader

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Boater Exposure Factors

		Adult	Adolescent	Child
		>18 years	14 to 18 years	7 to 13 years
Bodyweight	Kgs	70 (154 lbs)	64.9 (145 lbs)	40.9 (90 lbs)
Duration	Years	24	5	7
Frequency	Days/year	259	98	13
ExposureTime	Hours/day	2	2	2
Ingestion Rate	mg/day	50	50	50
Skin Surface Area	cm^2	2,500	2,500	4,400
Adherence Factor	mg/cm^2	0.3	0.3	0.2

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Wader Exposure Factors

		Adult	Adolescent	Child
		> 18 years	7 to 18 years	1 to 6 years
Bodyweight	kgs	70 (154 lbs)	52 (114.4 lbs)	15 (33 lbs)
Duration	Years	24	12	6
Frequency	Days/year	13	39	13
ExposureTime	Hours/day	1	1	1
Ingestion Rate	mg/day	50	50	100
Skin Surface Area	cm^2	6,100	5,100	2,500
Adherence Factor	mg/cm^2	0.3	0.2	0.2

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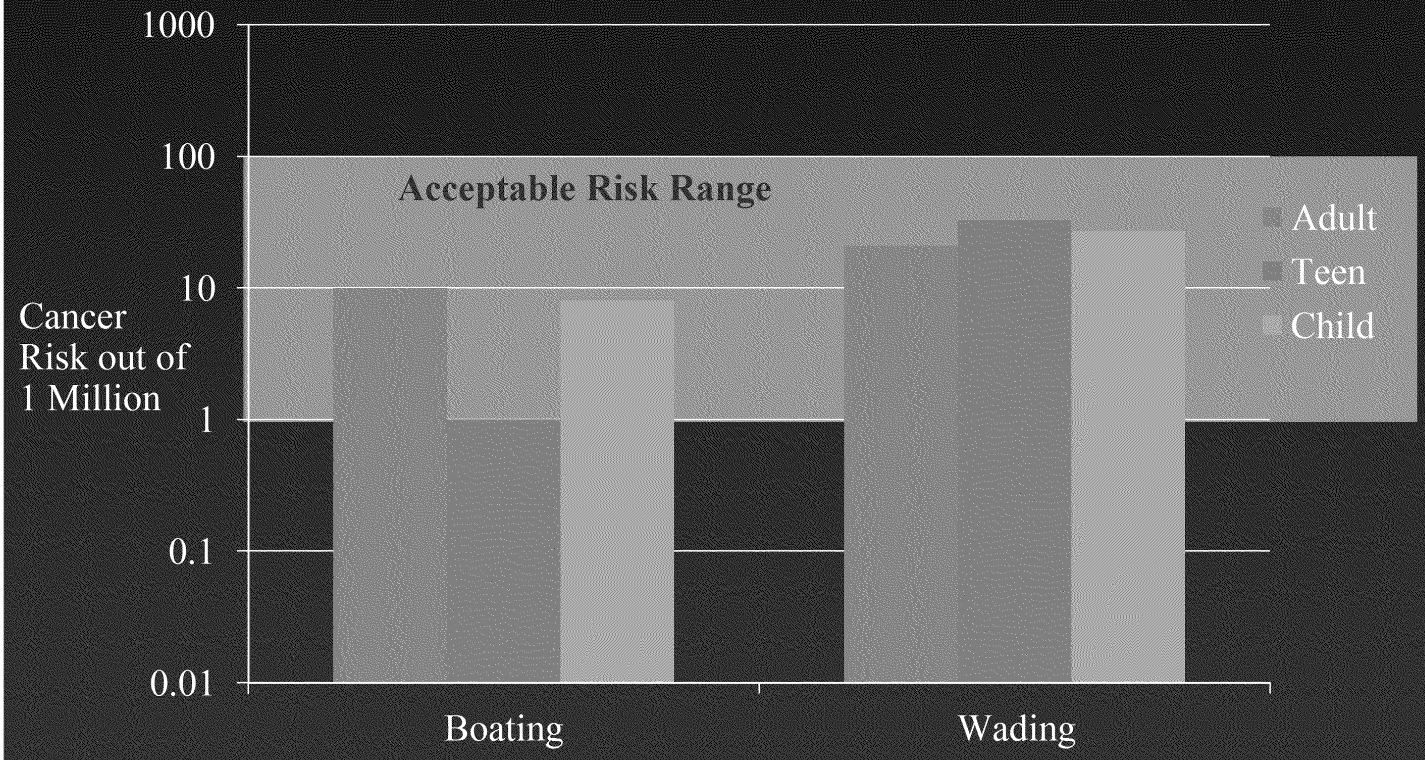
Cancer Risk Summary
Sediment Exposures



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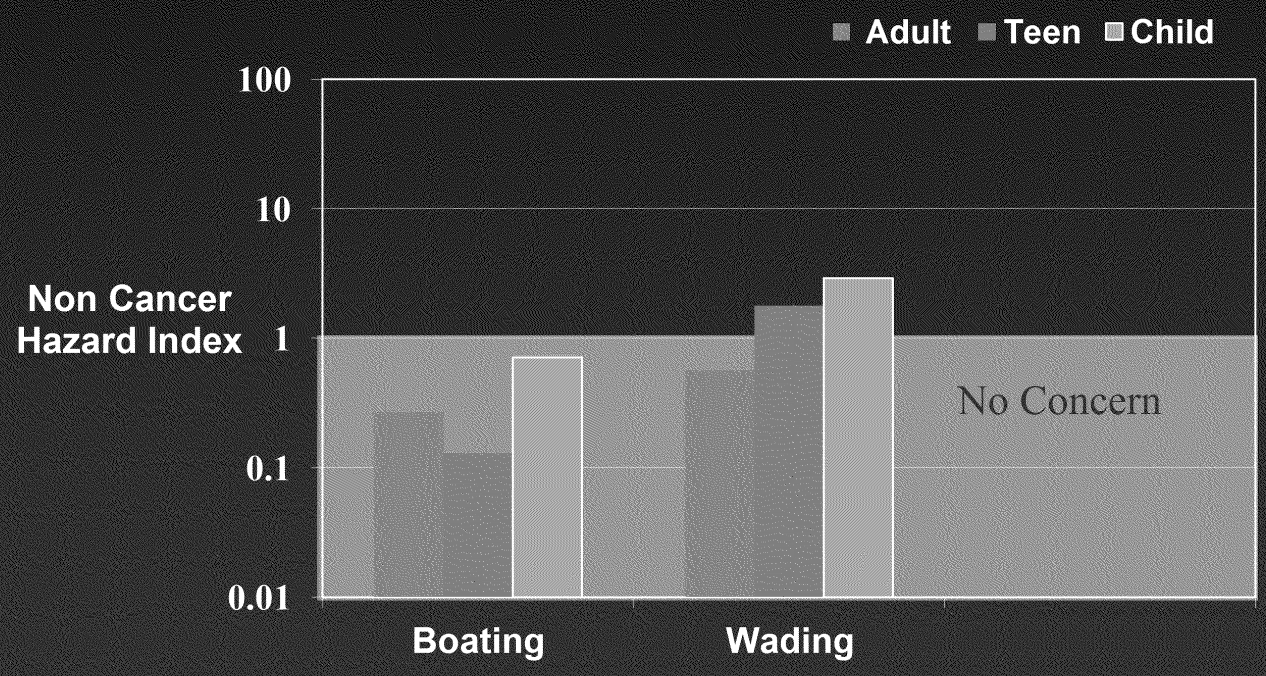
Non-Cancer Hazard Summary
Sediment Exposures



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Sources of Toxicity Data

- U. S. Environmental Protection Agency Integrated Risk Information System
  - Agency consensus database of toxicity values
  - Values independently peer-reviewed
  - Used at all Superfund sites
  - http://www.epa.gov/IRIS/

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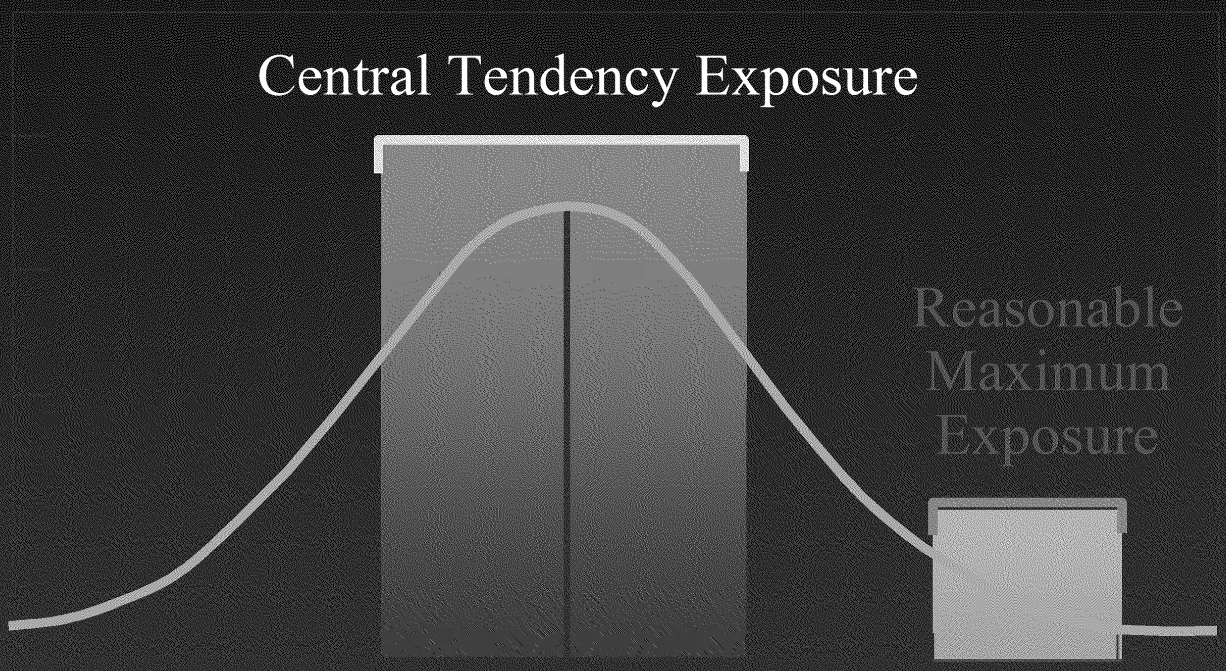
•EXPOSURE ESTIMATES



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Example: EXPOSURE FACTORS

$$\text{Intake} = \frac{C \times IR \times EF \times ED}{BW \times AT}$$

Exposure Factor	Value
Concentration (C)	Sampling Results
Ingestion Rate Sediment (IR)	Mg/day
Exposure Frequency (EF)	days/year,
Exposure Duration (ED)	Years
Bodyweight (BW)	Age dependent
AT (averaging time)	(depends on whether a carcinogen or a non-carcinogen)

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